

## PATENT ABSTRACTS OF JAPAN

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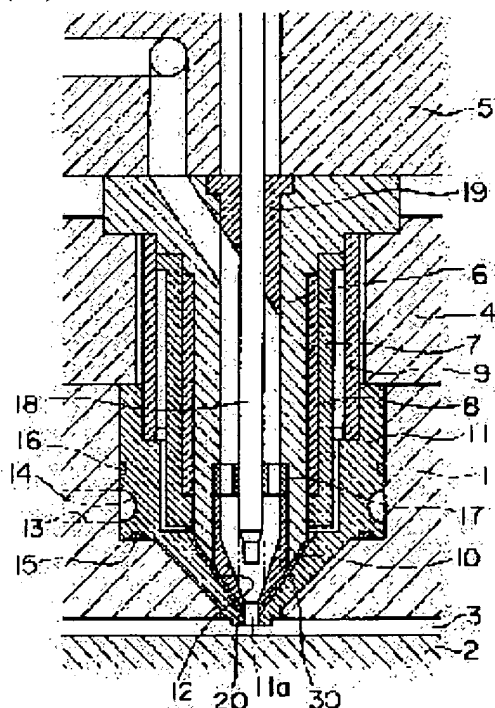
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### (54) INJECTION MOLD



#### (57)Abstract:

**PURPOSE:** To provide an injection mold, in which the heat insulating properties between a valve body and a mold body opposite to the valve body can be improved and the sure temperature controlling of a gate part can be carried out.

**CONSTITUTION:** By ceramic member 30, which is interposed in a gap 20 made between the end part of a valve body (or a valve bushing 6 and a tip member 10) and the inner surface of the conical hole 12 of a gate bushing 11, resin is prevented from entering in the gap 20, resulting in keeping the heat insulating effect in the gap 20. At the same time, due to the low heat conductivity of the ceramic member 30 itself, the heat energy flowing through the ceramic member 30 is checked to the utmost.

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**CLAIMS**

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[Claim(s)]

[Claim 1] A cavity is formed between the templates of a pair and the resin path which is open for free passage to the above-mentioned cavity through the gate is prepared in one template. And a movable rod is arranged movable at shaft orientations to the bulb inside of the body which constitutes the above-mentioned resin path, and it sets to the injection-molding metal mold which opens and closes the above-mentioned gate at the tip of this movable rod. To the template with which the edge by the side of the gate of the above-mentioned bulb object is formed in the shape of a taper, and counters the edge by the side of the gate of this bulb object Injection-molding metal mold characterized by infixing a ceramic member in this gap while the wearing hole equipped with the edge by the side of the gate of a bulb object is formed and a gap is formed between the edge by the side of the gate of the above-mentioned bulb object, and the inside of the wearing hole of a template.

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**DETAILED DESCRIPTION**

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[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the injection-molding metal mold of the valve-gate method which opens and closes the gate at the tip of a movable rod.

[0002]

[Description of the Prior Art] As injection-molding metal mold of this kind of valve-gate method, the thing as shown in drawing 2 is known, for example. If this injection-molding metal mold is explained, while a sign 1 is a fixed template and the movable template 2 is formed free [ approach and alienation ] to this fixed template 1 in drawing 2 , between these templates 1 and 2, the cavity 3 which makes a mold-goods configuration is formed. And the fixed tie-down plate is attached in the above-mentioned fixed template 1 through the fixed supporting plate 4 and the spacer block which is not illustrated, and the manifold 5 is installed between the fixed supporting plate 4 and the fixed tie-down plate. Moreover, the interior of the above-mentioned fixed supporting plate 4 and the fixed template 1 is equipped with the bulb bush 6, and the coiled form heater 7 is formed in the periphery of this bulb bush 6. And the periphery of the coiled form heater 7 is equipped with the heater covering 8 and the tubed part material 9. Furthermore, the point material 10 is screwed on at the tip of the above-mentioned bulb bush 6, this point material 10, the bulb bush 6, the heater covering 8, and the tubed part material 9 are countered, and the fixed template 1 is equipped with the gate bush 11. This gate bush 11 is formed in the shape of [ the diameter of is reduced, so that it goes at a tip ] a funnel, and let tip inner skin of this gate bush 11 be the cone-like hole 12. And this cone-like hole 12 is equipped with the above-mentioned point material 10 and the bulb bush 6, and while the gap 20 of the shape of a funnel which is open for free passage to interior of tip (gate) 11a of a gate bush 11 is formed between the cone-like hole 12 of a gate bush 11, and the point material 10 and the bulb bush 6, in this gap 20, the gap formed between the heater covering 8 and a gate bush 11 is open for free passage. Moreover, the cooling path 14 which is open for free passage to the cooling path 13 formed in the fixed template 1 is formed in the end face section peripheral face of the above-mentioned gate bush 11, and it faces across this cooling path 14, and is equipped with O rings 15 and 16 of a pair between the gate bush 11 and the fixed template 1. And between the above-mentioned bulb bush 6 and the point material 10, the interior of the guide member 17 is carried out, and this guide member 17 consists of two or more support plate sections which connect between outer cases with the outer case with which the bulb bush 6 was equipped, and the container liner which carries out guidance support of the movable rod 18 among these. It passes along interior of tip (gate) 11 of interior [ of the point material 10 ], and gate bush 11 a between the interior of each of the above-mentioned manifold 5 and the bulb bush 6, and the inside-and-outside cylinder of the guide member 17, and melting resin is supplied to a cavity 3 further again. And the interior of the lock out member 19 is carried out to the upper part of the above-mentioned bulb bush 6, a supporting guide is carried out to the interior of this lock out member 19, and the container liner of the guide member 17, and the above-mentioned movable rod 18 slides along with that axis.

[0003] And if it is in the injection-molding metal mold constituted as mentioned above In the mold clamp condition which closed between the fixed template 1 and the movable templates 2, by sliding the movable rod 18 Gate 11a is opened, it passes along interior of tip (gate) 11 of interior [ of the point material 10 ], and gate bush 11 a between the interior of each of a manifold 5 and the bulb bush 6, and the inside-and-outside cylinder of the guide member 17, and melting resin is supplied to a cavity 3. Subsequently, while sliding

the movable rod 18 and closing the above-mentioned gate 11a, after cooling and solidifying the resin in the above-mentioned cavity 3, between the fixed template 1 and the movable templates 2 is opened, and the mold goods in a cavity 3 are made to release from mold. In this case, since the above-mentioned gate bush 11 cools and solidifies the resin in a cavity 3 promptly to being heated at the coiled form heater 7 in order to hold the resin supplied in a cavity 3 in the melting condition, it is cooled by the above-mentioned bulb bush 6 and the point material 10 with the cooling water which circulates to the cooling paths 13 and 14. And between these gate bushes 11, and the bulb bushes 6 and the point material 10 is especially insulated mutually [ near the gate 11a ] by the gap 20 currently formed between a gate bush 11, and the bulb bush 6 and the point material 10.

[0004]

[Problem(s) to be Solved by the Invention] By the way, in the heat tracing method of a configuration of having formed the coiled form heater 7 in the exterior of the above-mentioned bulb bush 6, since it is difficult to arrange the coiled form heater 7 to near the gate 11a, it is difficult to control the temperature of a gate 11a part by control of the coiled form heater 7 finely. Moreover, the resin in the above-mentioned bulb bush 6 and the point material 10 While it must always hold in the melting condition by warming, the resin with which it filled up in the cavity 3 Although the gap 20 for heat insulation is formed between a gate bush 11, and the bulb bush 6 and the point material 10 as mentioned above in order to have to make it solidify promptly by cooling Resin will become easy to trespass upon this gap 20 from gate 11a, air with high adiabatic efficiency will be eliminated, and the width of face of this gap 20 has the problem that adiabatic efficiency falls on the contrary, when the width of face of a gap 20 becomes large, while adiabatic efficiency increases so that it enlarges.

[0005] It is in this invention having been made in view of the above-mentioned situation, and the place made into that purpose being able to improve adiathermic [ between a bulb object and the mold which counters this bulb object ], and offering the injection-molding metal mold which can perform temperature control of a gate part certainly.

[0006]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, as for this invention, a cavity is formed between the templates of a pair. The resin path which is open for free passage to the above-mentioned cavity through the gate is prepared in one template. And a movable rod is arranged movable at shaft orientations to the bulb inside of the body which constitutes the above-mentioned resin path, and it sets to the injection-molding metal mold which opens and closes the above-mentioned gate at the tip of this movable rod. To the template with which the edge by the side of the gate of the above-mentioned bulb object is formed in the shape of a taper, and counters the edge by the side of the gate of this bulb object A ceramic member is infixed in this gap, while the wearing hole equipped with the edge by the side of the gate of a bulb object is formed and a gap is formed between the edge by the side of the gate of the above-mentioned bulb object, and the inside of the wearing hole of a template.

[0007]

[Function] If it is in the injection-molding metal mold of this invention, while preventing the resin which trespasses upon a gap and holding the adiabatic efficiency in a gap by the ceramic member infixed in the gap between the edge by the side of the gate of a bulb

object, and the inside of the wearing hole of a template, the heat energy which transmits and flows a ceramic member by the lowness of the thermal conductivity of the ceramic member itself is controlled as much as possible.

[0008]

[Example] Hereafter, one example of this invention is explained based on drawing 1 . In addition, in this example, about the part of the same configuration as the above-mentioned conventional example shown in drawing 2 , a same sign is attached and explanation is omitted.

[0009] In this example, the gap 20 currently formed between a gate bush 11, and the bulb bush 6 and the point material 10 is equipped with the ceramic funnel-like member 30. The reason for having adopted the ceramic member 30 has very low thermal conductivity here as conditions for the ingredient with which the above-mentioned gap 20 is equipped, and heat-resistant temperature is 400 degrees C or more, and it is because it has a certain amount of reinforcement and what has good workability is moreover required.

[0010] If it is in the injection-molding metal mold constituted as mentioned above, resin is poured in into a cavity 3 by moving the movable rod 18 and opening gate 11a in a mold clamp condition, as usual. Subsequently, the above-mentioned movable rod 18 is moved and gate 11a is blockaded. And after the resin in a cavity 3 cools and solidifies, between the fixed template 1 and the movable templates 2 is opened, and internal mold goods are made to release from mold. In this case, in order that the above-mentioned bulb bush 6 and the point material 10 may hold the resin supplied in a cavity 3 in the melting condition, while being heated at the coiled form heater 7, since the above-mentioned gate bush 11 cools and solidifies the resin in a cavity 3 promptly, it is cooled by it with the cooling water which circulates to the cooling paths 13 and 14. And while the gap 20 is formed between the above-mentioned gate bush 11, and the bulb bush 6 and the point material 10 Since it is equipped with the ceramic member 30 in this gap 20, resin does not invade from the gate 11a side in the above-mentioned gap 20. Moreover, by adiathermic [ of the ceramic member 30 ] It insulates thermally and between a gate bush 11, and the bulb bushes 6 and the point material 10 becomes possible [ performing temperature control of a gate 11a part certainly ].

[0011]

[Effect of the Invention] As explained above, as for this invention, a cavity is formed between the templates of a pair. The resin path which is open for free passage to the above-mentioned cavity through the gate is prepared in one template. And a movable rod is arranged movable at shaft orientations to the bulb inside of the body which constitutes the above-mentioned resin path, and it sets to the injection-molding metal mold which opens and closes the above-mentioned gate at the tip of this movable rod. To the template with which the edge by the side of the gate of the above-mentioned bulb object is formed in the shape of a taper, and counters the edge by the side of the gate of this bulb object While the wearing hole equipped with the edge by the side of the gate of a bulb object is formed and a gap is formed between the edge by the side of the gate of the above-mentioned bulb object, and the inside of the wearing hole of a template Since a ceramic member is infixed in this gap, while preventing the resin which trespasses upon a gap and holding the adiabatic efficiency in a gap by this ceramic member By controlling the heat energy which transmits and flows a ceramic member by the lowness of the thermal conductivity of the ceramic member itself as much as possible Adiathermic [ between a

bulb object and the mold which counters this bulb object ] can be improved, and temperature control of a gate part can be performed certainly.

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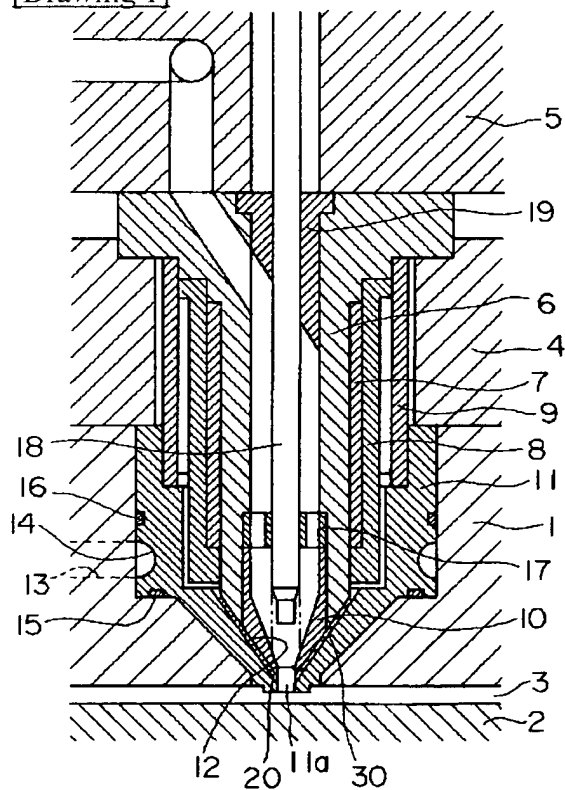
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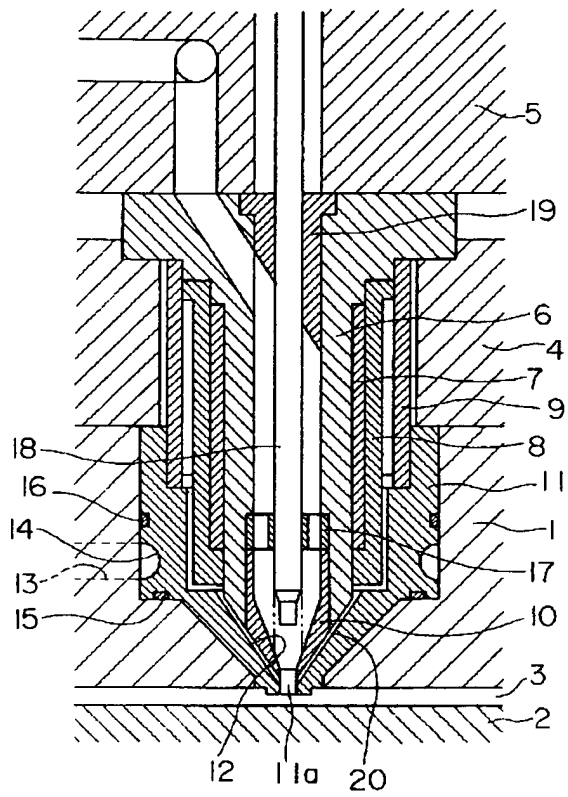
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## DRAWINGS

[Drawing 1]



[Drawing 2]



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